Appendix A

Pending Claims

18. (Amended) A method of determining the presence of one or more target analytes in one or more samples comprising:

a) contacting said one or more samples with a composition comprising:

i) a substrate with a surface comprising a plurality of assay locations, each assay location comprising an array location, comprising a plurality of discrete sites; and

ii) a population of microspheres comprising at least a first and a second subpopulation each comprising a bioactive agent;

wherein said microspheres are distributed on said surface such that said discrete sites each contain no more than one microsphere; and

b) determining the presence or absence of said target analyte.

19. (Amended) A method of determining the presence of one or more target analytes in one or more samples comprising:

a) adding said one or more samples to a first substrate comprising a plurality of assay locations, such that said sample is contained at a plurality of said assay locations;

b) contacting said sample with a second substrate comprising:

i) a surface comprising a plurality of array locations, each array location comprising an array location, comprising a plurality of discrete sites, wherein at least one assay location is in fluid contact with at least one array location; and

ii) a population of microspheres comprising at least a first and a second subpopulation each comprising a bioactive agent;

wherein said microspheres are distributed on said surface such that said discrete sites each contain no more than one microsphere; and

c) determining the presence or absence of said target analyte.

20. A method according to claim 18 wherein each of said assay locations comprises a library of bioactive agents.

21. A method according to claim 18 wherein said substrate is a microtiter plate and each assay location is a microtiter well.

22. A method according to claim 18 wherein each discrete site is a bead well.

23. A method according to claim 18 wherein each of said subpopulations further comprise an optical signature capable of identifying said bioactive agent.

24. A method according to claim 18 wherein at least a first and second microsphere in said subpopulations further comprise an identifier binding ligand that will bind a decoder binding ligand, whereby said bioactive agent is identified by said identifier binding ligand binding to said decoder binding ligand.

25. A method according to claim 19 wherein said first substrate is a microtiter plate.

26. A method according to claim 19 or 25 wherein said second substrate comprises a plurality of fiber optic bundles comprising a plurality of individual fibers, each bundle comprising an array location, and each individual fiber comprising a bead well.

27. A method according to claim 19 wherein each of said subpopulations further comprise an optical signature capable of identifying said bioactive agent.

28. A method according to claim 19 wherein each of said subpopulations further comprise an identifier binding ligand that will bind a decoder binding ligand such that the identification of the bioactive agent can be elucidated.

29. A method according to claim 18 or 19 at least one of said target analytes is a nucleic

acid.

30. A method according to claim 18 or 19, wherein said microspheres are randomly distributed on said surface.

31. A method according to claim 18 or 19, wherein at least a first subpopulation of microspheres comprises a bioactive agent comprising nucleic acids.

32. A method according to claim 18 or 19, wherein at least a first subpopulation of microspheres comprises a bioactive agent comprising a protein.

33. A method according to claim 20, wherein at least a first and second of said assay locations comprise the same library of bioactive agents.

34. A method according to claim 20, wherein at least a first and second of said assay locations comprise different libraries of bioactive agents.